Space Weather Forecast

Issued on Thursday, 16 May 2024 at 00:25 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of further Strong class flares, mainly from new region on east limb with the recent very active sunspot moving further onto the far-side. S1 Minor Solar Radiation Storm easing.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: High with two Strong class flares observed. The largest was at 15/0837 UTC, from the very active region over the southwest limb, which continued to produce observable activity. However, its associated magnetic looping is becoming increasingly obscured behind the Sun, limiting the potential for further flares to be observed. A further Strong flare, however was also observed peaking at 15/1438 UTC, from the southeast limb. The region associated with this is yet to become visible, but some notable magnetic looping is also evident on this limb, and this region will likely move into view through the coming 24 hours. There are currently thirteen sunspot regions on the visible disc, however these are all relatively small, simple, and stable with only limited growth observed. The largest of these was in the southeast, and showed some growth within its intermediate spots.

Coronal Mass Ejections (CMEs) were observed with the Strong flares, however these are not Earth-directed. A filament eruption (line of material ejected by the Sun) was also observed around 15/0950 UTC from the northeast disc, however this has been assessed as likely missing Earth, passing north and behind.

Solar Wind / Geomagnetic Activity: A weak CME glance was observed, likely from the long duration Moderate flare on 13 May. No notable speed change was observed, with the elevated winds easing through the period to be slightly elevated, from 550 km/s to below 450km/s. However the Interplanetary Magnetic Field (IMF), which was initially weak, exhibited a small increase to near Moderate levels 15/1814 UTC. The north-south component remained weak however, and mainly in a negative (southward) direction. Geomagnetic activity was Quiet to Unsettled (Kp1-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is currently at S1/Minor Radiation storm due to the flare activity from the large complex sunspot (now over the southwest limb) during the last couple of days. This count rate is very gradually easing.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is now expected, with a slight chance of further Strong class flares. These mainly from the new region that is expected to rotate onto the southeast limb. However, there is perhaps a very slight chance of further flares being observed from the complex sunspot over the southwest limb during the first few hours. The regions currently on the visible disc are smaller and simpler, with isolated M-flares possible from these.

Solar Wind / Geomagnetic Activity: There is now one CME that may bring glancing influences, from a filament eruption on the north-east disc on 14 May. This is forecast to arrive either late day 2 or early day 3 (17-18 May), but low confidence. Otherwise, solar winds are currently slightly elevated with a very slightly enhanced magnetic field, due to the glancing CME from 13

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May, however this is forecast to ease with no other notable enhancement currently expected. Mainly Quiet activity is expected with Unsettled intervals, but with the potential for Unsettled to Active spell with a slight chance of G1 Minor Storm intervals from the CME glance.

Energetic Particles / Solar Radiation: The count rate of energetic particles is likely to continue above the S1 Minor Radiation storm threshold, but with a declining trend and falling below this level day 1-2 (16-17 May). However further increases are also possible given the occurrence of any significant flares from the large and complex sunspot, although with a decreasing likelihood.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	5	5	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	60	50	40
Very Active	R3 to R5 X	Yes	25	20	10	10

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Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	Yes	100	30	10	5
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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